Mr. R. Abercromby and Mons. C. Moussette each exhibited some very fine photographs of clouds; and Mr. J. S. Dyason showed a number of sketches of skies in colour.

WILLIAM MARRIOTT.

THE BOTANICAL DEPARTMENT, NORTHERN INDIA.

UP to the year 1874-75, the Botanical Gardens at Saharanpur and the Botanical Officer in charge of them were Imperial, *i.e.* were under the control of the Supreme Government. In 1875, under the scheme of decentralization by which the independent powers of local Governments were considerably increased, the charge of the Saharanpur (Botanical) Institute became provincial, and passed under the authority of the Lieutenant-Governor of the North-Western Provinces and Oudh.

In 1887 the subject of reorganizing the Botanical Survey in India was taken up in connection with the memorandum, dated February 10, 1885, by Mr. Thiselton Dyer, Director of the Royal Gardens, Kew, and after consultation with the Government of the North-Western Provinces and Oudh and the Superintendents of the Botanical Gardens, Howrah and Saharanpur, the Government of India determined that the most important step which it was desirable to take in order to bring the hitherto unexplored regions of India under botanical survey was to expand the circle, for the botanical investigation of which the Saharanpur Officer was responsible, so as to bring the greater part of Upper India within the sphere of his duties. In order to effect this object it became necessary to restore the Saharanpur Botanist to his former position as an Imperial officer. A further reason for this change was found in the necessity for maintaining, at the disposal of the Government of India, the services of a Botanical Officer with a specially trained staff for the purpose of accompanying expeditions in the neighbourhood of or beyond our north-western frontier. These duties have now been attached to Mr. Duthie, the officer who holds the Saharanpur appointment.

The transfer took effect from April 1, 1887. But the Gardens, with the assistant, Mr. Gollan, who was brought out in 1879, were not placed under Imperial control, but still remained provincial. The Imperial Botanist is therefore now divorced from the Curatorship of the Gardens, which has passed, under the general control of the Director of the Provincial Department of Agriculture, into the hands of the former assistant. The Botanical Officer retains his occupation of the house and Botanical Museum (with the Herbarium), but has no longer any connection with the practical management of the surrounding gardens.

The Botanical Officer retains under his control the whole of the native staff connected with the Museum and its Herbarium, as well as the native artist (now drawing Rs. 100 a month), who was trained at the Bombay School of Art specially for the Saharanpur Institution.

THE NEW SIBERIAN ISLANDS.[1]

THE Expedition of MM. Bunge and Toll, who have explored the lower Yana and the islands of New Siberia during the last two years, was sent out by the Russian Academy of Sciences. Hedenstrom's description of the masses of petrified wood which is found on these islands, and the information gathered from the hunters as to the richness of the archipelago in remains of Quaternary mammals, were the chief inducements for sending out the Expedition.[2] The Expedition consisted of Dr. Bunge, who had just terminated his two years' stay at the Sagastyr Polar station at the mouth of the Lena; Baron Toll; two Cossacks, four Yakuts, and two Tunguses. After having explored the region at the mouth of the Yana during the summer of 1885,[3] and spent the winter at the Kazatchie settlement, twenty miles to the south of Ust-Yansk, the Expedition started in the spring for the New Siberian Islands, and for better exploring them divided into two parties. Dr. Bunge undertook the exploration of the southern islands of the archipelago, and especially of the small Lyakhoff Island, while Baron Toll explored the northern islands (Kotelnyi, Thaddeus, and New Siberia), usually called the Anjou Islands.

Owing to some misunderstanding Dr. Bunge did not find his reindeer on the small Lyakhoff Island, which was his chief station; and, until June 14, he was compelled to limit his explorations to a few excursions only. He saw large flocks of ducks coming from the north—that is, from what is an open sea on our maps, while several species of *Larus* and *Totanus* came from the south. As a rule, few birds cross to Little Lyakhoff Island in their migrations; only geese come by the end of June, and as they moult on the shores of the small lakes and ponds of the island, they are killed in great numbers by the hunters.

The winter lasts on the Little Lyakhoff Island until the first part of June, and returns again in October. On October 16 the frost was already − 37° C., but even during the summer 10° C. over zero is considered a very hot temperature; and in July there were thirteen days with snow, fifteen with fog, four with rain, and one snowstorm.

And yet organic life develops with astonishing rapidity. The first flowers were seen on June 11, and Dr. Bunge's collection of phanerogams numbers seventy species; but all plants are dwarfs, hardly reaching a few inches, while the soil, even in the best situated places, thaws only to the depth of 16 inches. The water of the small ponds is so much warmed by the rays of the sun, that temperatures of from 10° to 16° C. were observed, and therefore worms and Crustacea rapidly develop in the ponds. The insects are few; even the mosquitoes do not plague men and cattle as they do on the continent; still, two butterflies were caught. As to mammals, herds of reindeer come every year from the continent to the islands, but in smaller numbers than formerly; they are followed by wolves. The snow fox is very common, but the common fox and hare are exceedingly rare visitors to the islands. The Polar bear has become of late very rare, and hunters attribute this to the fact that the ice has remained unbroken for several yeas past. They affirm that the ice around the coasts has not moved since the year when Nordenskiöld sailed through in the *Vega*, and Dr. Bunge doubts whether it will soon be possible to repeat the same journey.

The chief interest of the island is in its masses of fossil bones buried in the frozen soil. Bones of the mammoth, rhinoceros, *Bos moschiferus*, two other species of *Bos*, several species of *Cervus*, very many bones of *Equus*, and several others, were found, and brought in by Dr. Bunge. The rocks of which the island is built are granite and sedimentary rocks without fossils.

Baron Toll's expedition was much richer in results. It appears from his surveys that the Kotelnyi Island extends much farther east than is shown on our maps, and that it is connected with Thaddeus Island by a sandy beach. It would be most interesting to know how far this circumstance is due to the upheaval of the islands, which is sure to go on like the upheaval of all the northern coast of Siberia. But the most important discovery is, that the masses of fossil wood which were found on Thaddeus Island proved to be Tertiary, and not Quaternary, as has hitherto been supposed. They belong to layers of Tertiary coal, and fossil *Sequoiæ* were found amidst them. We have thus a new proof that the great Tertiary continent which possessed a warm climate, well known from Oswald Heer's description, included not only Greenland, Spitzbergen, and Novaya Zemlya, but also the New Siberian Archipelago, more than 90° of longitude to the east of Novaya Zemlya. Geology must explain the existence of this warm climate beyond the 75th degree of latitude, at a period so closely preceding that of the glaciation of the northern hemisphere.

Finally, Baron Toll, after having made rich zoological, botanical, and palæontological collections—Silurian, Devonian, and Triassic deposits being found on the Kotelnyi Island,—reached the northern extremity of the island under the 76th degree of latitude, and thence he saw the land which was seen eighty years ago by Sannikoff, and has since periodically appeared on, and disappeared from, our maps. It exists, and it is situated nearly a hundred miles (150 versts) due north, off the northern extremity of the Kotelnyi Island.

If we take into account the facts that there are serious reasons for admitting the existence of a land to the north of Novaya Zemlya,[1] and that the existence of Sannikoff's Land is now again

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[1] See the Preliminary Report by A. Bunge in the *Izvestia* of the Russian Geographical Society, vol. xxiii. 1885, 5th fascicule.

[2] See Dr. Schrenck's "Zur Vorgeschichte der von der Akademie ausgerüsteten Expedition," in *Beiträge zur Kenntiss des Russischen Reichs*, 3te Folge, 1886.

[3] The account of the explorations in the Yana region has appeared in the *Beiträge zur Kenntniss des Russischen Reichs*, 1886.

[1] See the "Report of the Commission for an Arctic Expedition" in the *Izvestia* of the Russian Geographical Society, 1871.

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confirmed, we must recognize that the discovery of Franz Joseph's Land was but a first step towards the discovery of the Arctic archipelagoes which undoubtedly exist under and within the 80th degree of latitude. P. A. K.

EARTHQUAKES IN THE LEVANT.[1]

THE Island of Zante, in the Ionian Group, to the north-west of the Gulf of Arcadia, is a centre from which no fewer than seven submarine cables radiate, and Mr. Forster has taken advantage of his position as manager of the station to make some interesting observations of the connection between interruptions of the cables and the occurrence of earthquakes, which are more frequent, he says, in the Levant than in any other part of the world, except Japan. The notes of what he has himself observed are valuable and suggestive, but unfortunately he has made them a peg on which to hang a theory that the "true and only reason for seismic disturbances" is that landslips and subsidences occur in ocean beds. Soundings of the bed of the Mediterranean, made chiefly in the interest of cable-laying, have brought to light extraordinarily rapid variations of depth. In one case, Mr. Forster tells us, the repairing ship of his company found a difference of 1500 feet between the bow and stern soundings. "We know of mushroom-shaped mountain ranges, abrupt and precipitous table-lands, immense marginal shelves and overhanging cliffs. . . . We know by soundings that many of these tottering masses are hanging over precipices from 3000 to 5000 feet in height, and that the erosion of the water at the base of the inverted cone-shaped rocks eventually causes them to slide over." Mr. Forster admits that a secondary cause of earthquakes may be "explosions owing to the filtration of water through the crevices and chasms that a denudation of so large an extent must necessarily cause." He has done good service in drawing attention to a cause of earthquakes which seismologists may have been disposed to under-rate, but he overstates his case outrageously in making this explanation cover every example. "I am prepared, of course," he says, "to encounter a torrent of objections to the acceptation of my theory as the sole cause of seismic disturbances" (*sic*), and this is well.

By way of supporting the theory he has written a long, rambling, inconsequent pamphlet, the manner and matter of which we may illustrate by quoting a paragraph that is neither better nor worse than its neighbours :—

"If, therefore, we are to believe that the process of cooling our planet, which began so many thousands of centuries ago, is gradually and surely condensing the nucleus of liquid or solid fire in its centre, it is reasonable to assume that the bed of the Mediterranean, by virtue of its more recent formation, should be more subject to the effects of the contraction of the upper crust than other parts which have gone through these periods already; because it is evident that the contraction which originally commenced began equally so over the whole surface of the earth's sub-crust, and was, through some unknown reason, abruptly suspended in certain parts which only subsided and very suddenly when the cooling action was once more renewed."

Or this, which the author himself puts in italics :—

". . . *The severity of the concussion is always precisely proportionate to the bulk of the falling mass, the depth of its fall, and the nature of the matter constituting it, and on to which it falls. . . .*"

We commend the following to the attention of electricians, as coming from one of their own number :—

"By 'freeing' a cable, it is understood that the end opposite to the testing-station is detached from the apparatus and left free in the air; and, provided the cable be electrically perfect, no deflection of the magnetic needle will appear at the testing-office when the cable is joined up through a delicate galvanometer to 'earth.' If, however, the cable thus insulated is lying near to or in the direct radius of a volcano, or near to any hot springs, the increased temperature would cause a thermopile to be set up, and by induction through the insulating material its presence would be plainly manifest."

The fact that in certain earthquakes the author made this test and found no current, is used as an argument to show the "absolutely local nature" of what in another place he calls the "*centri*" of the shocks.

What is of real value are his positive observations of certain cases where the rupture of a cable or the production of a bad fault in it took place at the moment an earthquake occurred, and of cases where, when the cable came to be repaired, the contour of the ocean bed was found to have undergone a distinct change, the cable being, in more than one instance, actually buried below the new surface. The great earthquake which destroyed Filiatra in August 1886, shook the telegraph office at Zante so sharply that the clerk rushed out. On returning to his Morse instrument, he found, by the paper band which was still running, that a message coming from Candia had been interrupted at the time of the shock, and tests taken immediately after showed a dead break 23 miles from Zante. Other cables, following a more northerly course, were not disturbed. In another instance a cable was broken at once in two places, 2 miles apart, apparently by a subsidence of the ground between. Once, when the Zante-Trepito cable was broken by an earthquake 7 miles from Zante, the repairing ship discovered "that the break had occurred in a depth of about 2000 feet of water, where about 1400 feet originally existed, and it was impossible to haul in the broken end, firmly jammed down by the mass which had fallen over and upon it."

If Mr. Forster had contented himself with telling the story of facts like these, which have come within his own observation, the seismologist would have felt nothing but gratitude. But these grains of wheat are only reached after wading through an intolerable deal of wordy chaff. The gist of the pamphlet is to be found in the last fifteen or twenty pages, and we advise the reader who wishes to save his patience to go to them at once. We conclude by quoting an interesting passage where Mr. Forster describes two natural phenomena of Cephalonia, about which one would like to know more :—

"Not far from Lizuri, which is on the western side of the Bay of Argostoli, is a moving rock which, unchanged by the roughest or the calmest sea, rocks to and fro with the regularity of a pendulum. It is separated from a fixed mass of rock against which it opens and shuts in its perpetual motion; at one time it will jam a knife placed in the crevice, from which, in a few seconds, extraction is impossible, whilst the next moment you can easily insert your bent hand when its maximum aperture has been reached. This phenomenon has been carefully examined by many scientific men; divers have been sent below to ascertain if it be the result of a detached rock from a neighbouring cliff having fallen on to another, and thus becoming very finely balanced, as all logan stones usually are. However, it was not only shown to be a perfectly solid rock, but it does not require the motion of the water to sway it, as so often we find it erroneously stated, the motive power for swaying it being furnished from an absolutely inexplicable cause. Nearly opposite to this rocking stone the other remarkable phenomenon is to be found, consisting of a body of water, equal in bulk to about half a million gallons per day, running in from the sea at four points on the coast somewhat rapidly for a certain distance until it gradually becomes sucked into the earth and disappears. By conducting the water into an artificial canal for a few yards, and by collecting the four points of supply into one, enough motive power is obtained to drive two mills. The stream, after being thus utilized, is allowed to follow its own course, and is lost among the rocks. . . . [It] has no visible outlet."

THE MINERAL CONCRETION OF THE TEAK TREE.[1]

AT the last meeting of the Nilgiri Natural History Society Mr. Lawson showed a specimen of a whitish mineral substance found in a teak tree growing in the Government Plantation at Nilambúr. This peculiar secretion is not altogether unknown to officers in the Forest Department, and its composition has on more than one occasion been investigated by chemists.

In 1870 the fact of calcareous masses occurring in timber was brought to the notice of the Asiatic Society of Bengal by Mr. R. V. Stoney, who stated (*vide* P.A.S.B., May 1870, p. 135) that many trees in Orissa had pieces of limestone or calcareous tufa

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[1] "Seismology: a Paper on Earthquakes in General; together with a New Theory of their Origin, developed by the Introduction of Submarine Telegraphy." By W. G. Forster, Manager and Electrician to the Eastern Telegraph Company, Zante. Dedicated, by Special Authority, to His Majesty George I., King of the Hellenes. Pp. 68. (London: Waterlow and Sons, 1887.)

[1] A Paper read by David Hooper at a meeting of the Nilgiri Natural History Society, Ootacamund, November 7, 1887.

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